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Living with Robots: Automation and Income Inequality in the 21st Century

Michael Dickson
History and Business
May, 2017

Faculty Adviser: Dr. Ali Modarres

Essay completed in partial fulfillment of the requirements for graduation with Global Honors,
University of Washington, Tacoma

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Approved:

Faculty Adviser

Date

Executive Director, Global Honors

Date

Introduction

In the field of a recently purchased patch of farmland in the middle of an expansive river valley in Washington State, a newly opened FedEx warehouse hums loudly. Surrounded by containers for over 100 trucks with many more located inside the building, this package-sorting facility processes over thirty thousand packages in a single shift during the peak holiday shipping season. Such a feat would not be possible unless a significant advancement was made to the building's architecture and design. Sitting in the middle of open air three stories above the concrete floor, a conveyor belt speeding along at thirty miles per hour carries packages as an airport terminal would. The only reason these packages get to every corner of the facility on time is due to the efforts of a single scanner, approximately 8 feet cubed, projecting red lasers from each side of the cube as they flash inward to the packages that pass between the scanner's arches. This piece of machinery, while simple in design, incorporates the latest available technology to not only increase the efficiency of every single worker in the sorting facility, but also render over twenty different positions at facilities like this one obsolete.

Modern variations of industrial automation like this one result in large scale unemployment. This comes from a pattern of established studies concluding that efficiency in industry creates unemployment (Mishel et al., 2015). This degree of unemployment and underemployment results in a widening of class divisions. These divisions are known to cause economic decline (Dvorkin, 2016), an increase in poverty (Mishel et al., 2015), and social unrest (Danaher, 2017). These effects are noticed throughout the globe. These social divisions and negative effects can be reduced or negated through the use of welfare programs or income redistribution systems, usually administered by the state.

The recent increase in industrial automation has prompted researchers and welfare advocates to investigate methods of reducing the negative effects of this global automotive industrial revolution. One of the most researched topics is Universal Basic Income plans. Universal Basic Income (UBI) is a method of implementing a non means based welfare program through the use of unconditional cash transfers (Murray, 2008, p. 2). Essentially, a UBI program ensures the basic needs of an individual (usually limited to food, water, and basic shelter) are met by the state through the use of an unconditional or universal cash transfer as opposed to the use of programs that are conditional (such as the food stamps program in the United States, which can only be used to buy certain items and have eligibility requirements to receive them).

This paper will analyze the theoretical and practical applications of Universal Basic Income throughout the world to analyze the possibility of implementing UBI programs in a multitude of environments. Moreover, this paper will analyze the many different basic income tests to determine under what circumstances that a UBI program is most useful and practical in terms of implementation. Finally, this paper will provide recommendations as to the implementations of these programs in the United States and around the world in the context of historical trends and past research.

Literature Review: Economic inequality from an American perspective and the role of automation in modern economies

Historically, economic systems throughout the world have a natural effect of concentrating wealth. The United States (a global economic leader) has had economic shifts that occurred to concentrate wealth in this manner.

Policies under the Franklin Delano Roosevelt administration throughout the 1930s and 1940s were aimed at providing programs which benefitted the poor through application of

Keynesian economics in his signature New Deal. Keynesian economics advocates the use of policies that transfer income and buying power to citizens and customers. This transfer is thought to increase economic output by increasing demand for basic products and services (Goldin & Margo, 1992). These programs included the application of food stamps and government-provided jobs in order to transfer income to the average citizen and jump-start the economy. While historians and economists still argue over the effectiveness of these programs at ending the Great Depression, the aftereffects of their implementation are widespread.

Implementation of FDR's programs resulted in a period called the Great Compression. This period of time was known for a rapid reduction of the income gap between the upper and lower class in America (Goldin & Margo, 1992, p. 1). This period of economic growth is thought to be a result of the new influx of workers into the workforce after WWII. This is due to both the addition of women to the workplace (effectively doubling the employable population) and the increased economic activity at the lower tiers of the economy due to the programs which eased this type of economic activity (Goldin & Margo, 1992, p. 10).

This period ended in the 1970s and 1980s where the income gap widened rapidly towards its pre-compression levels. This is due to a number of policy decisions and economic shifts, including the underrepresentation of workers in unions throughout this period (Mishel et al, 2015). It was exacerbated by the 1981 PATCO air traffic controllers' strike, which was broken up by President Ronald Reagan, starting a pattern of union under-representation that exists in the United States to this day. (Mishel et al, 2015). In addition to this, financial investments among the upper class increased throughout this period due to the removal of the Glass-Steagall Act, allowing further financial and economic investment without creating jobs for the lower class.

These economic policies and investments are part of what is widely referred to as supply side economics, or as it was known during the period, Reaganomics. These economic policies seek to increase investment by lowering regulation. The use of financial investment is thought to increase the investment in all forms of business as more loans are available for businesses which encourages economic activity (Mankiw & Weinzierl 2004, p. 2-3). Supply side economics proposes that, as long as work is available, economic poverty will remain low. This fact has been called into question in recent years, as economic financial investment has increased while poverty has also increased throughout modern times (Mishel et al., 2015).

In the modern day, these policies have resulted in an increase in economic inequality throughout the world. A number of effects have been observed such as expansion of transnational corporations and the increase in the mobility of capital (Slaughter & Swagel, 1997). The increased mobility of capital allows transnational corporations to move freely and exploit labor throughout the world (Slaughter & Swagel, 1997). In addition, the incorporation of supply side economics in the United States has resulted in effects such as a reduction in union employment (50% enrollment to 10%), an increase in economic disparity (20% increase), and the decrease of effective wages for workers as relative to productivity increases (Mishel et al, 2015).

The use of new methods of automation has the potential to dramatically increase these trends and worsen economic inequality among the classes. Attention is paid to advancements in robotics technologies due to their direct impact on manufacturing labor, which has been occurring since 1990 (Acemoglu & Restrepo, 2017) and recently has resulted in a severe decrease in manufacturing activity, and therefore manufacturing employment, in America (Hicks & Devaraj, 2017, p. 6). The use and projection of technology is always in question, and often is

misinterpreted and misrepresented in the popular media (Wajcman, 2017; Kaplan, 2017, p. 37-38). The difference between this robotics expansion and previous industrial revolutions is the implementation of robots like Handle (Ackerman & Guizzo, 2017) and drone technology, allowing the construction and use of relatively affordable and plentiful robots to perform a variety of tasks. Regardless, there is a mass agreement among scholars that the advancement in robotics will contribute to a severe growth of unemployment in a multitude of industries unless used as an inefficient assistant instead of an independent machine (Braun et al, 2016). Academics still debate the potential impact of these advances, some predicting upwards of 47% growth in unemployment in the United States within the next 20 years (Frey & Osborne, 2013, p. 1) with concentrated effects in developed economies (Manyika et al., 2013), while others predict a more reserved response towards reducing or eliminating certain types of job growth (Dvorkin, 2016).

What is conclusively different in this modern industrial revolution is the incorporation of advanced artificial intelligence in industries in labor replacement and efficiency improvement roles (Markoff, 2012). While significantly different than artificially intelligent systems portrayed in movies such as *The Terminator* and *2001: A Space Odyssey*, these machines are able to use new programming techniques and technological advances to make sound judgements and correct decisions to a degree previously thought impossible. This increased decision-making ability allows robots and computer systems to perform an extreme variety of tasks, such as playing Jeopardy (IBM, 2016) or Go (DeepMind, 2017), diagnosing cancer patients (IBM, 2017) (Cohn, 2013), serving hamburgers (Murray, 2013), manning a call center (Ankeny, 2015), or driving a vehicle (Gilmore, 2017). These technologies have the immediate potential impact of eliminating the jobs of 3.5 million truck drivers in the United States alone using only the technology available today in addition to industries like Uber and Lyft (Manyika et al., 2013, p. 78-85).

While the use of automated labor increases, less income will be available for those that use work as a means for income. In a system such as this there are two possible solutions to prevent the increase in poverty associated with the increase in automated production. The first is the destruction or reduction in the use of robotics and artificial intelligence systems, thereby lessening their impact and negatively affecting the growth of industries that rely on advancements from these technologies to improve. The second method is the use of welfare programs in order to transfer income and prevent an increase in poverty as industries become more automated. This paper addresses latter change in policy.

Traditional Welfare programs compared to Universal Basic Income

Social welfare programs are designed in order to benefit society through the elimination or reduction of economic conditions which create or are caused by poverty. These programs are invested in the wellbeing of society through a distribution of funds collected by government via tax income. They can vary from distribution of goods and services that fulfill basic needs such as food to the use of programs to help individuals who have children. These programs can be as extensive as Child's Pay, a program in many European countries which provides income to parents to assist them with childcare (Healy et al., 2012, p. 18). The majority of these programs are administered via needs-based testing, which is a method used to test the income and economic condition of an individual or family to determine if it truly needs government assistance. In addition, many programs have basic eligibility requirements that must be adhered to, or face the repercussions of losing access to essential benefits.

A Universal Basic Income program is decidedly different than this means tested system. Instead of testing to validate that an individual is of a lower poverty level, the only requirement of receiving this payment is registration of citizenship. Under this system, every citizen of a

country receives a payment that covers their basic needs. In this method, Universal Basic Income can be used as a method to elevate all citizens above the poverty line (Clark, 2002, p. 2). Such a method usually costs more than a standard welfare program, and therefore necessitates higher tax incomes to supply the larger amount of money distributed to the populace.

Traditional method of needs based testing and eligibility have flaws however. One such flaw is the creation of a “welfare trap,” where an individual or family income increases and as a result makes them ineligible for previously ensured government assistance. In order to combat this, poor individuals or families must avoid going above these income levels and do not actively pursue higher paying jobs or other income opportunities. This has the secondary effect of reducing economic output and employment due to individuals attempting to maintain a low income level as to remain eligible. In addition, means-tests require funds to be diverted from income support to the testing itself, which ensure that a certain percentage of the costs are “wasted” or not given to the poor that the programs are meant to serve. Murray (2008) estimates that a comparable guaranteed income program can be implemented at, “no more than the projected cost of the current system as of 2011” (p. 1).

A Universal Basic Income program does not have this negative effect. Due to the universal and unconditional nature of this system, an individual receives this income regardless of their level of income. This immediately ensures that the welfare programs that provide for the needs of the poor also ensure that they do not reduce economic performance. Moreover, the costs of a system that uses a means-test is immediately reduced due to the low costs of a cash transfer program such as UBI.

Universal Basic Income: Affordability

The affordability of welfare programs is exceedingly important when considering the implementation of UBI across a large population. Universal Basic Income is specifically concerning when considering the amount of money required to implement correctly. This is due to the large scale of UBI programs, as they propose to provide enough income to eliminate poverty. Therefore, in order for any program to be politically viable in a country, it must ensure that a number of stakeholders are satisfied in order to allow it to be implemented. While an analysis of every basic income proposal for every country would take multiple volumes, this paper will examine one American-centric example in order to evaluate the feasibility of such a program. This proposal by Allan Sheahen (2006) uses two different methods in order to fund a Universal Basic Income program. He does this through reduced government spending as opposed to other methods such as deficit spending or monetary policy modification; solutions that are politically untenable and would result in hyperinflation.

Both proposals begin with evaluating the cost of implementing a program of this size. Through estimates provided by the US government, Sheahen estimates a cost of \$1.9 trillion dollars for a Basic Income grant, which incorporates all the citizens of the United States at the time after removing non-citizens, prisoners, and those who don't apply from the program (2006, p. 7). The first proposal then affords the \$1.9 trillion bill with a series of adjustments to American tax policy that 1) eliminates 138 tax exemptions, 2) eliminates personal exemptions, 3) eliminates now unnecessary programs, 4) eliminates \$160 billion from US defense spending, 5) reverses changes to the tax code to those in 1994, 6) simplifies the tax code to only use individual filing due to the application of a basic income program, 7) increases taxes on the upper classes by using "a surcharge of 20% to incomes over \$1 million" and 8) "extend[s] the

12.4% payroll tax to all earned income” (Sheahen, 2006, p. 7-11). He then proposes a simplified 2% wealth tax to eliminate the government deficit.

Sheahen’s second proposal is much simpler than his first. The proposal is similar to many others done by economists through the implementation of a “flat tax” or a tax that takes into consideration of taxing a portion of all earned income in the country as opposed to a “universal tax,” one flat tax rate applied to all individuals. Under this program, the \$6.2 trillion of incomes in the United States gets taxed at 35%, resulting in an income of \$2.17 trillion, which allows enough income to implement a basic income program (Sheahen, 2006, p. 11). Through these two proposals, Sheahen shows that, even though the United States is an economy that is not well known for spending an exorbitant amount on welfare programs, can still reasonably afford the costs to implement a UBI system.

While the political ramifications of instituting a UBI program are beyond the scope of this paper, it is important to note the difficulties with attempting to pass a basic income program. In the United States, passing a tax increase through a conservative-controlled congress is almost impossible. In addition, the reduction in benefits to even a small portion of the population may result in a lack of support at a congressional level and make the implementation of a UBI system politically untenable (Torry, 2014, p. 1-2). A UBI system can become politically viable by changing a standard basic income plan to ensure that all participants receive an amount more than their current allocation through welfare as Malcolm Torry (2014) proves in his research into the subject in the United Kingdom (p. 8).

Universal Basic Income: Analysis of performed tests

Each of the following sections details a past Universal Basic Income test or program that in whole or in part resembles a UBI program in either execution or income level. Using these

tests results, the further analysis shows the positive benefits of the program and the limitations of the information's applicability to a larger, national scale UBI program. This section shows that, even though there is significant evidence supporting the implementation of a program such as UBI, there are also significant limitations on these results when placed in a national perspective.

Negative Income Tax in the United States: A series of experiments

One of the most important arguments against the implementation of a Universal Basic Income system is a negative impact on the workforce. Detractors of these policies argue that by eliminating the absolute need to work that is- by attaching basic needs to a job- there will be a negative impact on the workforce as a result of a mass exodus of people leaving the job market. This subsequent loss of jobs will then result in the elimination of a taxable income base and therefore both eliminate the funding used for a UBI program and create a host of negative secondary effects.

Four separate Negative Income Tax (NIT) experiments were conducted in the United States in the 1960s and 1970s. These tests were aimed at establishing whether the above statement was true in a simulated setting. These experiments emphasized ensuring a minimum standard of living rather than increasing economic impacts through income redistribution. These tests emphasized the inclusion of multiple varied populations. The New Jersey Graduated Work Incentive Experiment and the Seattle and Denver Income Maintenance Experiment used this method to test a multiplicity of demographics in an urban setting. Correspondingly, experiments in rural areas of North Carolina, Iowa, and Gary, Indiana were chosen to represent rural areas. Efforts to implement a GAI, UBI, or NIT program in the United States were not pursued due to the results of the Seattle and Denver experiment.

The primary testing metric, whether or not people on the program would leave the workforce, found that while some secondary wage earners left the workforce temporarily, they returned a short time later. However, a secondary result of the experiment found an increase in divorces among the testing participants (Widerquist, 2005). These findings have been challenged in recent times however, with the evidence that this finding was as a result of a statistical error (Cain & Wissoker, 1990), which was one of the reasons that NIT policies were not further pursued in the United States. Regardless of these results, the efforts to pursue this program ended with the implementation of supply side economics during the 1980s as a response to widespread stagflation in the 1970s.

Using these experiments as a representative of larger populations is problematic. Karl Widerquist has investigated these tests in the United States and is interested in the results and possible limitations of these tests (2005). The results of these tests all conclude that the impact on the workforce in the event of a negative income tax program is statistically negligible. Widerquist (2005) also points out that these tests were all very limited in scope when compared to large scale implementations across an entire nation, and therefore presents problems when implementing these programs on a larger scale. He also criticizes a variety of studies done on these tests which do not conclusively establish whether the United States should implement this sort of program (Widerquist, 2005). Widerquist (2005) concludes by qualifying that these results could be used in a positive or negative light for or against the implementation of an NIT system. He also concludes that these programs cannot decisively prove that a decrease in workforce across a large economic sector will not occur as the scale of these experiments is too small to gauge secondary effects. It is clear that further testing in this area is required in order to define the extent that such a program would have on a large population.

Manitoba MINCOME Study: A rural farming community and UBI

This basic income test occurred from 1975 to 1979 in Manitoba, Canada. Two communities were chosen to be tested in this experiment, Winnipeg and Dauphin. Winnipeg residents were randomly chosen in order to compare to members of other communities as part of a series of individual impact tests. Dauphin was chosen to be a “saturation site” where the entire community was given a basic income (Forget, 2011, p. 2). This test was also severely limited due to the costs of the program, as the original funding was preliminary and would require further supplement as the experiment continued. Combating economic stagflation in the 1970s took both attention and funding from anti-poverty measures, resulting in the conclusion of the program in 1979.

The abrupt end to the test eliminated the chance for a conclusive study or report from the project, however results and records were still logged from the experiment. A number of secondary effects were observed from the saturation site that were not directly connected to unemployment. High school attendance rates increased significantly throughout the testing period. Forget (2011) theorizes that this effect has two different sources. Firstly, the additional income security for the community allowed families a measure of assurance that their funding would not disappear even if their traditional income source (farming) was inconsistent (p. 12). This allowed secondary wage earners, such as mothers and children, to participate in other activities, such as school. Moreover, Forget believes the increased attendance rates to be based off of the increased cohesiveness of social groups in Dauphin’s schools. As secondary wage earners were not required to work, it allowed them to remain with their friends in school and receive their education together (p. 12).

Forget's (2011) primary research was based on medical records produced by the Dauphin study. Her research was originally justified under the theory that improved income security leads to improved medical outcomes. While studying this program, results were examined for many different metrics, from contacts made with doctors, hospitalization rates, accident reporting, and even the childbirth records of mothers born during the test. Forget found that, "overall hospitalizations, and specifically hospitalizations for accidents and injuries and mental health diagnoses, declined for MINCOME subjects relative to the comparison group" (Forget, 2011, p. 22). The results found during this experiment were "larger than one might have expected since only about a third of families qualified for support at any one time and many of the supplements would have been quite small" (Forget, 2011, p. 22), demonstrating the impact of income security on a population.

Namibia: UBI effects on Otjivero-Omitara

Namibia is a country in Sub-Saharan Africa bordering South Africa. The economy of Namibia is based on mining and industry. The country is well known for mining diamonds and uranium which accounts for over 50% of its international trade (United Nations COMTRADE Database, 2015). Namibia is also the driest country in Sub-Saharan Africa, and as a result imports a majority of its cereals and foodstuffs from other countries rather than producing them. Though large in size, the majority of the land in Namibia is desert. The government of Namibia signed a document in 2004 which lays out its plan for ensuring "Sustainable Agriculture, Health and Development, and Education" by 2030 and commits to, "reduce inequalities and move the nation significantly up the scale of human development, to be ranked high among the developed countries in the world" (Government of Namibia, 2017).

Otjivero-Omitara is a village and its surrounding area in Namibia which were the subject of a Basic Income Guarantee experiment in 2008 under the Basic Income Grant Coalition, a series of private organizations and NGOs within Namibia. This program is “the first universal cash-transfer pilot project in the world” (Haarmann et al., 2009, p. 13). This program is similar to a full UBI program in the modern sense. Otjivero-Omitara was known as a “hotbed of criminal activity” at the time, with many problems, such as “illegal hunting, trespassing, and the collection of firewood” (Haarmann et al., 2009, p. 20). The project transferred N\$100 (approximately \$7.50 US) to each citizen in the community under 60 years of age once a month for two years and was financed through private donations (Haarmann et al., 2009, p. 19). It is important to note that a wave of migrants to the area had resulted in new members not receiving the grant and therefore dropped the average income of the community prior to the start of the test (Haarmann et al., 2009, p. 34). This result affects average statistics from the study, but was controlled for when publishing the results.

The effects of this basic income study were drastic across many metrics. An increase in education, a decrease in crime rate, an increase in health standards, and food standards were all noted as a result of the grant. More specifically, the most drastic result was a reduction in food poverty, with 76% of residents in the testing area below the food poverty line before the test, which was reduced to 16% of individuals which received grants, which had a net effect of improving childhood nutrition as well (Haarmann et al., 2009, p. 50-54). Moreover, crime decreased by over 35% during the period of the test as a result of a significant decrease of economically based crime such as illegal hunting (95% decrease) stock theft (43% decrease), and other types of theft (20% decrease) (Haarmann et al., 2009, p. 44-47). Interestingly, economic

creation activity increased from 44% to 55% over the period while also increasing education attendance throughout the area (Haarmann et al., 2009, p. 70-82).

Independent of the testing guidance, the community took action in order to ensure responsible spending of the grant. An independent committee was formed by many individuals of the villages in order to ensure that the community benefitted as a whole (Haarmann et al., 2009, p. 37). The committee persuaded many alcohol stores to close the day of the payouts, reducing alcohol sales overall. As a result of these measures alcohol consumption did not waste the money earned from the basic income grant (Haarmann et al., 2009, p. 42). More of this money was spent on individual assets such as those for economic activity from new businesses or the purchase of household assets to increase quality of life (Haarmann et al., 2009, p. 92).

The study also investigated the feasibility of this type of program over a large scale, namely, the entire country of Namibia. It found that a Basic Income Guarantee in Namibia is quite affordable. More specifically, the tax capacity of Namibia has been evaluated as 30% of the national income, which Namibia is currently exploiting only 25% of (Haarmann et al., 2009, p. 16-17) which is more than sufficient for providing a similar program throughout the country. Additionally, other plans exist for the use of national value added taxes and taxes on minerals; Namibia's largest industry (United Nations COMTRADE Database, 2015). The report concludes that by investing in the poor of Namibia, economic development will improve and assist the country with meeting its 2030 development goals (Haarmann et al., 2009, p. 95-97).

Madhya Pradesh, India

Similar to the Namibia basic income grant, a test was done for the state of Madhya Pradesh, India. The test was conducted in tribal villages of the province, 8 being tested and 12 others serving as controls (SEWA Bharat, 2014, p. 3-4). Instead of transferring paper money to

individuals under armed guard as was the case in Namibia, bank accounts were created for the residents of Madhya Pradesh with “near universal acceptance” (SEWA Bharat, 2014, p. 3). Like the Namibian experiments however, the communities were distributed income universally as opposed to investigating in a manner such as a randomized control trial.

This experiment resulted in a significant altering of household dynamics and economics, which are listed below (SEWA Bharat, 2014):

- Increased access to sources of sanitation, drinking water, cooking and lighting sources (p. 7).
- Increased food sufficiency and reduced malnutrition, especially among girls (p. 16).
- Medical benefits increased, including a larger choice in the variety of health services, better food to prevent illness, and less debt related medical expenses (p. 11).
- The pilot project reduced the amount of children working in child labor, increased school spending, and nearly doubled the amount of girls in school by the end of the pilot (p. 13).
- Economically, a 233% increase in people participating in productive work was observed, including an increase in small farms and a significant increase in working hours. This also included an increase in livestock available, as opposed to a slight decrease in the control groups (p. 15).
- Women reported an increase in the equitable decision making in regards to finances over the life of the pilot (p. 6).
- Similar to the Namibian BIG study, there was not an increase in the amount of alcohol bought among members of the pilot program (p. 11).
- The presence of cash on hand and a more stable income allowed a notable reduction of household debt, and an increased use of community borrowing as opposed to the use of predatory moneylenders. The presence of available cash allowed those on the basic income

pilot to participate in many different other government provided programs, such as increased access to government hospitals, easier access to subsidized grain and kerosene, increased access to school uniforms and bicycles, and others (p. 18-19).

The report concludes by recommending further testing in other settings, the use of individual money transfers in welfare programs, an increased involvement in agencies such as SEWA, and increase in the use of this type of program among tribal populations (SEWA Bharat, 2014, p. 21). The report also suggests that careful implementation is necessary if used to replace existing resources, as a sudden transfer of resources could result in a negative impact on those not yet using the new program, which would have a negative effect on their welfare benefits (SEWA Bharat, 2014, p. 21-22).

Both this study and the Namibian BIG study are evidence of significant impacts in especially vulnerable communities. Access to any income in these communities has evidence in stabilizing the job market and allowing further creation of wealth. Moreover, the elimination of poverty has resulted in a number of secondary benefits providing a significant increase of human development in these areas. Finally, these tests show that individuals in these communities are capable of making responsible decisions while increasing the economic activity in those areas, allowing a cash transfer program to work under certain circumstances.

Eastern Band of Cherokees Casino Dividend and the Alaskan Permanent Fund: Not basic, but beneficial

These two income redistribution citizen's income tests are implementations of a pseudo-basic income that does not satisfy all of the basic needs of a population. The Eastern Band of Cherokees Casino Dividend is an income supplement program that uses a portion of the casino profits to redistribute to Native American members of the reservation. The Alaskan Permanent

Fund is a constitutionally implemented program in Alaska that redistributes assets and income from minerals that will not be available in the future, primarily oil (Alaska Department of Revenue, 2017). It is used in order to benefit the people of Alaska that have lived there for more than a full calendar year (Alaska Department of Revenue, 2017) and is invested in low risk investments such as stocks, bonds, and real estate (Alaska Permanent Fund Corporation, 2017). This program has also been used in order to model other programs such as for protecting natural resources in Pennsylvania (Bishop, 2014, p. 817-819).

A study investigating substance use disorders and mental health disorders in relation to the programs beneficiaries by Costello, Erkanli, Copeland, and Angold discovered that there were “fewer psychiatric disorders in adulthood. The effect was strongest for alcohol and cannabis abuse and/or dependence, and was specific to the youngest cohort” (Costello et al., 2010) when given income support of around \$9,000 a year in 2006. In Alaska, an immediate effect of increasing birth weight was noted following the implementation of the Alaska Permanent Fund (Chung et al., 2016, p. 583). Moreover, partially as a result of this program, Alaska has one of the lowest poverty rates in the nation at 10.3% (Bishaw and Glassman, 2016, p. 3). Even though these methods of redistribution were not aimed at providing for the basic necessities of a population, positive benefits were still observed amongst them.

Both of these programs represent income redistribution to members of a community without the aimed goal of reducing poverty within the context of an experiment. This avoids the Hawthorne effect examined by Widerquist (2005) which has been argued to unduly influence those receiving benefits. While the effects of this program are limited, they positively affect the communities and societies in which they are involved. Moreover, these sites also serve as

examples in which further income redistribution and basic income programs can be implemented.

Canadian pension plans: A form of UBI

Canadian retirement Old Age Security (OAS) program resembles a UBI system. The only metrics used in order to determine eligibility for this program are, “seniors must be Canadian citizens or legal residents, and must have lived in Canada for a minimum of ten years after 18 years of age”; the program “is a universal benefit [for] seniors 65 years and above” (Mcintyre et al. 2016). By using information from Canadian retirees transitioning into the OAS program, McIntyre, Dutton, Kwok, and Emery (2016) compared food insecurity across the population that was accepting OAS payments and those that were still using traditional benefits. They found that food insecurity dropped significantly among seniors on OAS payments, “show[ing] that GAI is an effective poverty reduction strategy, particularly for low-income individuals who experience food insecurity” (Mcintyre et al., 2016, p. 283). This program has also been argued to have positive effects on those who cannot normally work due to limiting factors such as mental or physical disabilities (Mays, 2016, p. 106-108).

Discussion: The errors and successes of UBI tests and programs

There are two primary metrics that can be observed from these tests: an increase in UBI tests is necessary to prove its efficacy across a larger population and that preliminary evidence indicates that, at least at small scales, a UBI system can be successful.

While the tests discussed above were all conducted and studied by social scientists or government organizations, the majority of them also present difficulties when attempting to interpret their results over large populations. Research focused on individual towns, cities, and villages does not properly interpret its results across larger populations. For instance, the effects

of the total elimination of poverty (a theoretical possibility under a UBI system) may have a number of secondary effects such as the increase in demand for cheap products or a drastic increase in consumer spending. These effects can be observed only through the experience and research of a large test over the scale of a nation.

While little evidence can be brought forth in regards to the reduction or elimination of poverty under a UBI program, the secondary effects observed during these experiments shed further light on the impacts that poverty can have on communities. It has been hypothesized that poverty is an indicator of many different types of negative effects throughout different societies (Wilkinson, 2011). This research indicates that this hypothesis is true, and that by combating poverty with a UBI program, beneficial secondary effects such as higher school attendance rates, decreased food poverty, increased health, decreased economic crime, increased participation in communities and society, and the increase of public work and investment can occur. Local implementations of UBI or cash transfer policies may yet reveal more effective results rather than at a nation-state scale.

Conclusion: The future implementation of Universal Basic Income

The current trend of increasing income inequality shows no sign of slowing down. While the income gap between rich and poor widens, automation threatens to render many millions throughout the world unemployable through a process of predictable yet revolutionary progress. In order to maintain the social norms of established economic patterns and human development standards throughout many parts of the world, it is important to analyze and adapt government welfare programs in order prevent a reduction in the standard of living for the world's population. This paper has used historical context and research on Universal Basic Income

programs from the past in order to analyze the merits and possibilities of implementing a program like it in the future.

At the current time, there are a multitude of UBI tests in progress throughout the world. Finland is currently conducting a UBI program spread throughout the nation in order to identify benefits and negative consequences of this program (Matthews, 2015). A German organization called Mein Grundeinkommen is currently running a lottery of sorts to “win” a basic income for a year and study those who receive it (Knight, 2015) in order to promote a basic income proposal. The Dutch city of Utrecht will be conducting a conditional basic income, giving \$1,100 to every citizen who stays employed (Weller, 2015). Canada will be implementing a variation of a Basic Income program in order to assess the usefulness of such a program in Ontario (Government of Ontario Ministry of Finance, 2016).

This paper has found that while UBI tests and programs have produced extensive secondary benefits to the communities in which they have been implemented, there is not enough evidence to support its full implementation into national or international policy decisions without further testing. The future implementations and tests of UBI should consider examining several different factors to improve performance and further the understanding of basic income plans. This author recommends an increased use of saturation sites as in the Dauphin MINCOME test in order to test in an environment where community multiplicative effects can be observed. In addition, testing a variety of income transfer amounts will examine both 1) the effects of larger transfer amounts on spending patterns and 2) determine the effect of sub-basic income plans, which could reduce poverty before the implementation of a full UBI program. Finally, the use of private organizations and NGOs in the funding and testing of UBI programs can be a method to increase the quantity of evidence regarding this program. These smaller implementations will

lead the way for national-scale tests, which will determine the full effects of this powerful yet theoretical program.

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